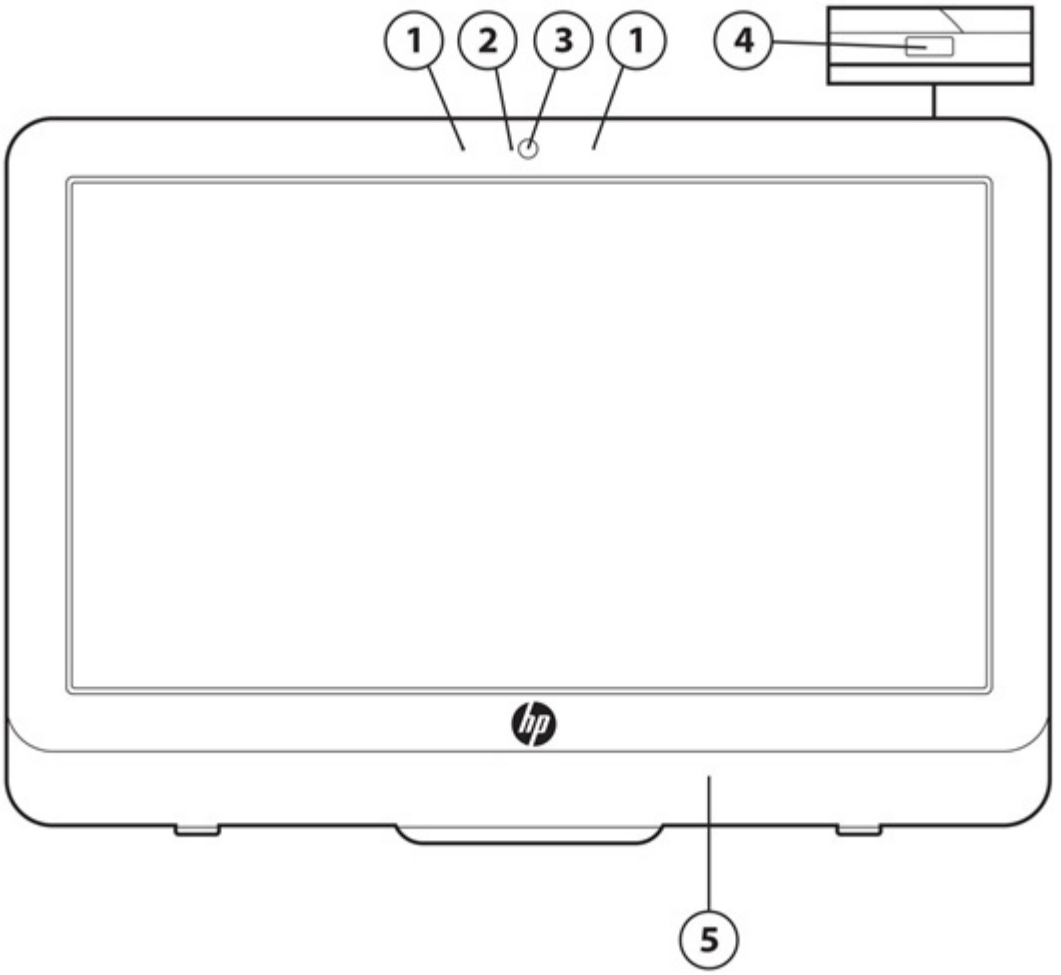
HP ProOne 400 G1 All-in-One Business PC

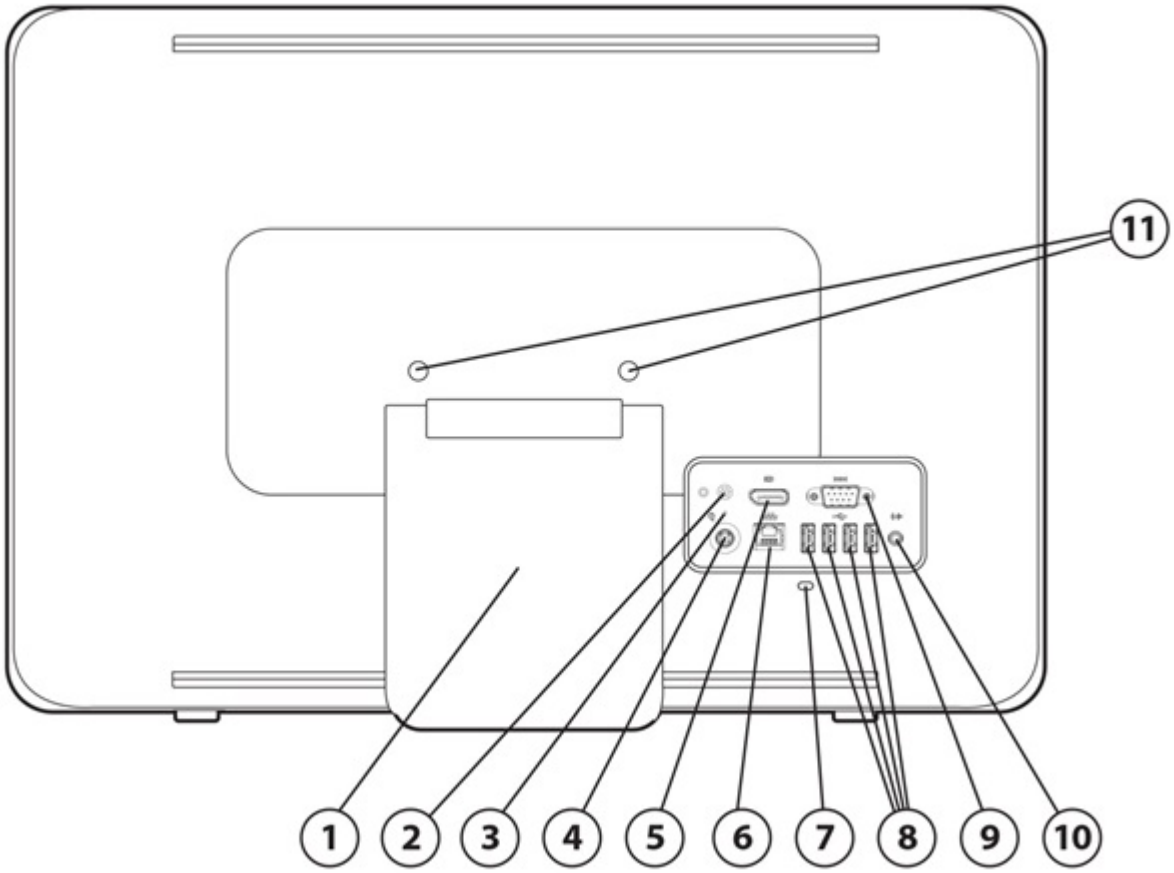


FRONT

1. Microphones (optional)
2. Webcam activity LED
3. Webcam (optional)
4. Power button
5. Speakers

Overview

HP ProOne 400 G1 All-in-One Business PC

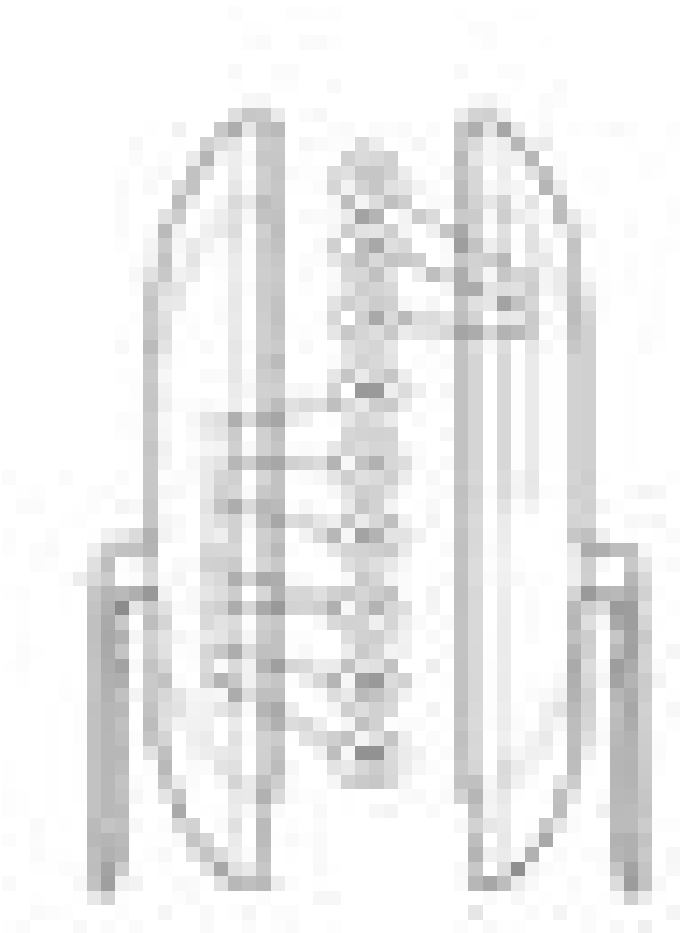


BACK

1. Stand
2. Security screw
3. Power connector LED indicator
4. Power connector
5. DisplayPort
6. RJ-45 Gigabit Ethernet port
7. Security lock slot
8. (4) USB 2.0 ports
9. Serial RS-232 port
10. Stereo audio line out
11. VESA mount

Overview

HP ProOne 400 G1 All-in-One Business PC



SIDE

1. Optical Disc Drive (optional)
2. Optical eject button
3. Optical activity LED
4. Hard Disc Drive activity LED
5. Media Card Reader activity LED
6. SD Media Card Reader (optional)
7. (2) USB 3.0 Ports, including 1 fast charging port
8. Microphone jack
9. Headphone jack

Overview

At A Glance

- Windows 7 or Windows 8.1
- 19.5 inch diagonal widescreen WLED backlit anti-glare LCD
- Integrated all-in-one form factor
- Intel® H81 Express chipset
- Intel 4th Generation Core™ processors
- Integrated Intel HD Graphics
- Integrated Realtek RTL8151GH-CG GbE Ethernet Controller
- Optional wireless connectivity:
  - Intel Dual Band Wireless-N 7260 (mini PCI Express)
    - Intel 802.11 a/b/g/n
  - WLAN and Bluetooth Combo Card
    - HP 802.11 a/b/g/n Bluetooth® 4.0
- WiDi support (with Intel 7260 WLAN and Intel® HD Graphics)
- Optional Integrated 1 MP webcam & dual microphone array
- Business quality speakers
- DTS Sound +™
- Up to 16 GB of DDR3 SDRAM, dual channel memory support, two SODIMM slots
- Up to 2 TB SATA Hard Drive, up to 180GB Solid State Drive, 256GB Self-Encrypting Solid State Drive, 500GB Self-encrypting Drive, 1TB Solid State Hybrid Drive
- Optional Slim Tray-load SuperMulti DVD Writer, DVD-ROM, or BDXL Blu-ray Writer Optical Disc Drive
- Optional SD Media Card Reader
- Serial port
- DisplayPort out with multi-stream
- Integrated VESA 100 x 100 mounting holes
- Skype Ready
- Low Halogen
- ENERGY STAR® qualified. EPEAT® registered where applicable/supported. See www.epeat.net for registration status by country.
- CCC, CECP & SEPA Certified

Standard Features and Configurable Components (availability may vary by country)

OPERATING SYSTEM

Preinstalled

Windows 8.1 Pro (64-bit)*
Windows 8.1 (64-bit)*
Windows 7 Ultimate (64-bit)**
Windows 7 Professional (32-bit)**
Windows 7 Professional (64-bit)**
Windows 7 Professional (32-bit) (available through downgrade rights from Windows 8.1 Pro)***
Windows 7 Professional (64-bit) (available through downgrade rights from Windows 8.1 Pro)***
Windows 7 Home Premium (32-bit)**
Windows 7 Home Premium (64-bit)**
Windows 7 Home Basic (32-bit)**

FreeDOS
Novell SUSE Linux Enterprise Desktop 11

*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com.

**Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

***This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

PROCESSOR

Intel® 4th Generation Core™ i7 Processors

Intel® Core™ i7-4765T
Up to 3.0 GHz Max. Turbo Frequency (2.0 GHz base frequency), 8 MB cache, 4 cores, 8 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate
Intel Stable Image Platform Program (SIPP)

Intel® 4th Generation Core™ i5 Processors

Intel® Core™ i5-4670T
Up to 3.3 GHz Max. Turbo Frequency (2.3 GHz base frequency), 6 MB cache, 4 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate
Intel Stable Image Platform Program (SIPP)

Intel® Core™ i5-4570T
Up to 3.6 GHz Max. Turbo Frequency (2.9 GHz base frequency), 4 MB cache, 2 cores, 4 threads
Intel HD Graphics 4600
Supports DDR3 memory up to 1600 MT/s data rate
Intel Stable Image Platform Program (SIPP)

Intel® 4th Generation Core™ i3 Processors

Intel® Core™ i3-4330 T
3.0 GHz base frequency, 4 MB cache, 2 cores, 4 threads
Supports DDR3 memory 1600 MT/s data rate
Intel HD Graphics 4600

Standard Features and Configurable Components (availability may vary by country)

Intel® Core™ i3-4130T
2.9 GHz base frequency, 3 MB cache, 2 cores, 4 threads
Supports DDR3 memory 1600 MT/s data rate
Intel HD Graphics 4400

Intel® 4th Generation Pentium® Processors

Intel® Pentium® G3420T
2.7 GHz base frequency, 3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory 1600 MT/s data rate

Intel® Pentium® G3220T
2.6 GHz base frequency, 3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory 1333 MT/s data rate

CHIPSET

Intel® H81 Express

SMBIOS

System Management BIOS, previously known as DMI BIOS, is used to store system management information.

HP BIOSphere

Key features of the HP BIOS include:

- Deployment and manageability - HP BIOS provides several technologies that help integrate the HP ProOne 400 Business PC into the enterprise, such as PXE, and F10 Setup support for 12 languages.
- Support UEFI specification 2.3.1
- Thermal and power management - The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Thermal Controlled Fans - Automatic or manual controlled fan speeds for cooling and acoustic performance Serviceability - HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery - HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery (Emergency Boot Block Recovery). In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS F10 setup and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features:

- Power-On password - Helps prevent an unauthorized user from powering on the system.
- Administrator password - Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) - Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Pro models use ACPI to provide power conservation features.
- S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W is S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.
- Master Boot Record Security - Helps to prevent changes and/or infections to the Master Boot Record caused by viruses or malicious code.
- HP BIOS Protection - prevents unauthorized updates or changes to the BIOS due to malware, viruses, or malicious BIOS updates. Based on NIST SP800-147 policy guidelines.

Standard Features and Configurable Components (availability may vary by country)

GRAPHICS

Integrated (*depends on processor*)

Intel HD Graphics: Basic , 4600, or 4400. Please see specific processors for graphics configuration.

Graphics controller	Intel® Processor Graphics
DisplayPort	Support for 1 external display
Memory	Up to 1.8GB DDR3
Supported Graphics APIs	DX11.1, OpenGL 4.0, OpenCL 1.2, full 1080p Blu-Ray Disc (H264) playback in hardware

WIRELESS DISPLAY

WiDi support with Intel Dual Band Wireless-N 7260 (mini PCI Express) and Intel® HD graphics

Desktop system requirements for Intel® Wireless Display

System Component	Requirement
Processor	4th generation Intel® Core processor
Graphics	Intel® HD Graphics
Wireless	Intel Dual Band Wireless-N 7260
Software	Intel® My WiFi Technology and Intel® Wireless Display must be pre-installed and enabled
OS*	Windows 7 32-bit/64-bit Home Premium, Ultimate, Professional; Windows 7 32-bit Home Basic

* Windows 8.1 supports Wireless Display natively.

DISPLAY

19.5" diagonal TN widescreen WLED backlit anti-glare LCD

Display Panel	Type	TN (Twisted Nematic) LED Backlit LCD
	Viewable image area (H x V) (mm)	433.92 x 236.34
	Screen opening (H x V) (mm)	434.92×237.34
	Resolution(H x V)	1600 × 900
	Aspect ratio	16:9
	Contrast ratio (typical)	1000:1
	Brightness (typical)	250nits (cd/m^2)
	Viewing angle (typical)	R/L 170°, U/D 160°
	Pixel pitch (H x V) (mm)	0.2712 x 0.2626
	Backlight lamp life (to half brightness)	30,000 hours minimum
	Color support	Over 16 million colors (through FRM)
	Anti-glare	Yes
	Default color temperature	Warm (6500K)
	NOTE: All performance specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.	
Adjustable Tilt Stand/Tilt Angle	10º to +25º to the vertical plane	

WEBCAM & MIC

Optional integrated 1 MP webcam & dual microphone array; maximum resolution of 1280x720

Standard Features and Configurable Components (availability may vary by country)

STORAGE

3.5" SATA Hard Drive

500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV
1 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV
2 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV

2.5" SATA Hard Drive

320 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV
500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV

2.5" Self-Encrypting Solid State Drive

128 GB, SATA, Self-Encrypting Opal 2 Solid State Drive
180 GB Intel Pro 1500, SATA, Self-Encrypting Opal 1 Solid State Drive
256 GB, SATA, Self-Encrypting Opal 2 Solid State Drive

2.5" Self-Encrypting Drive

500 GB, SATA, Self-Encrypting Drive

2.5" Solid State Hybrid Drive

500 GB, SATA, Solid State Hybrid Drive
1 TB SATA, Solid State Hybrid Drive

Optical Disc Drive

Slim SATA DVD-ROM
Slim SATA SuperMulti DVD Writer
Slim SATA BDXL Blu-ray Writer
No included Optical Disc Drive

Removable

HP Slim Removable SATA HDD Frame/Carrier

Media Card Reader

HP 5-in-1
Supports Secure Digital (SD, SDHC, SDXC, Memory Stick (MS), Memory Stick Pro (MS Pro))

MEMORY

Type

Non-ECC, DDR3 SDRAM, 1600 MHz, SODIMM

Maximum

16 GB

# of Slots

2
204-pin supporting dual-channel memory
Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

NOTE: Full availability of 4 GB or more of memory requires a 64-bit operating system. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Standard Features and Configurable Components (availability may vary by country)

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

Integrated Realtek RTL8151GH-CG GbE LOM 10/100/1000

- With Wake-on-LAN

NOTE: The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Wireless

Intel 802.11 a/b/g/n wireless 7260 PCIe minicard (optional)

- Up to 300 mbps data rate

HP 802.11 a/b/g/n wireless PCIe minicard with Bluetooth Combo (optional)

- Up to 300 mbps data rate
- Bluetooth 4.0 compliant
- Works with a wide range of Bluetooth devices

AUDIO/MULTIMEDIA

DTS Sound +™
Realtek ALC3228 codec - 16 & 24-bit PCM
Integrated business class 2.0 speakers (2W x 2)
Stereo headphone jack
Microphone in
Stereo line out
Optional integrated 1.0 MP webcam & dual microphone array - Up to 30 frames/sec

KEYBOARDS AND POINTING DEVICES

Keyboard

HP USB Standard	104 keys plus special functions for Mute, Volume Up, Volume Down, Sleep & Multimedia control keys Separate numeric keypad Cable length 71 in (180 cm)
HP Wireless Keyboard & Mouse	104 keys plus special functions for Mute, Volume Up, Volume Down, Sleep Separate numeric keypad; two buttons with scroll wheel acting as third button Operates at ~ 2.4 GHz and supports a working distance of up to 23 ft (7m) Keyboard contains 25% post-consumer recycled plastic material
HP USB CCID SmartCard Keyboard	104, 105, 106, 107, 109 layout (depending upon country) All ISO 7816 smart cards
HP USB PS/2 Washable Keyboard	SpillSeal® keyboard technology protection USB & PS/2 support in one solution Separate numeric keypad Cable length 7ft (2.2m)

Mice

HP USB Optical Mouse	Two buttons with scroll wheel 71 in (180 cm)
HP USB 1000dpi Laser Mouse	1000 dpi support Two buttons with scroll wheel Cable length 70.8 in (180 cm)
HP USB PS/2 Washable Scroll Mouse	SpillSeal® mouse technology protection Two buttons with scroll wheel 8.8 ft total 70 cm+ 2m extension

Standard Features and Configurable Components (availability may vary by country)

SECURITY

Security lock slot
HP Keyed Cable Lock
USB port disable
Rear cover security screw

POWER

External 120W, up to 89% efficient, active PFC
100-240V AC

Power Efficiency	89%	88%
Volts	230	100/115

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Included	**Windows 7**	**Windows 8.1**
Security	Computrace HP Device Access Manager with Just In Time Authentication HP Drive Encryption HP File Sanitizer (SSDs and Hybrid Drives not supported) HP Disk Sanitizer External Edition[1] HP Client Security HP Trust Circles Standard Microsoft Security Essentials	Computrace HP Device Access Manager with Just In Time Authentication HP Drive Encryption HP File Sanitizer (SSDs and Hybrid Drives not supported) HP Disk Sanitizer External Edition[1] HP Client Security HP Trust Circles Standard Microsoft Defender
MultiMedia	Cyberlink Power DVD, BD Cyberlink Power2Go (Secure Burn) Cyberlink YouCam BE	Cyberlink Power DVD, BD Cyberlink Power2Go (Secure Burn)
Communication		HP Wireless Hotspot
HP Value Add	HP ePrint Driver[2] HP Manageability (activation required) HP PageLift HP Recovery Manager HP Support Assistant HP Recovery Disk Creator	HP ePrint Driver[2] HP Manageability (activation required) HP PageLift HP Recovery Manager HP Support Assistant
3rd Party	Adobe Flash Player Box PDF Complete, Corporate Edition Skype	Box PDF Complete, Corporate Edition Skype
Microsoft Products	Buy Office	Buy Office

[1] Available via download.
[2] Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter).Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.

Standard Features and Configurable Components (availability may vary by country)

ENVIRONMENTAL & INDUSTRY

ENERGY STAR® qualified models available

EPEAT® registered where applicable/supported. See www.epeat.net for registration status by country.

Industry standard certifications:
UL
CSA
FCC compliance
ENERGY STAR®
EPEAT® Gold
EUP Lot6 Tier2
CCC
CECP
SEPA
CEL

For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

WEIGHTS & DIMENSIONS

Weight

With stand
12.2 - 12.9 lbs
5.55 - 5.84 kg

Without stand
11.2 - 11.8 lbs
5.07 - 5.36 kg

Shipping box
18.9 lbs
8.58 kg

Shipping pallet (50 units)
967.8 lbs
439 kg

Dimensions (W x D x H)

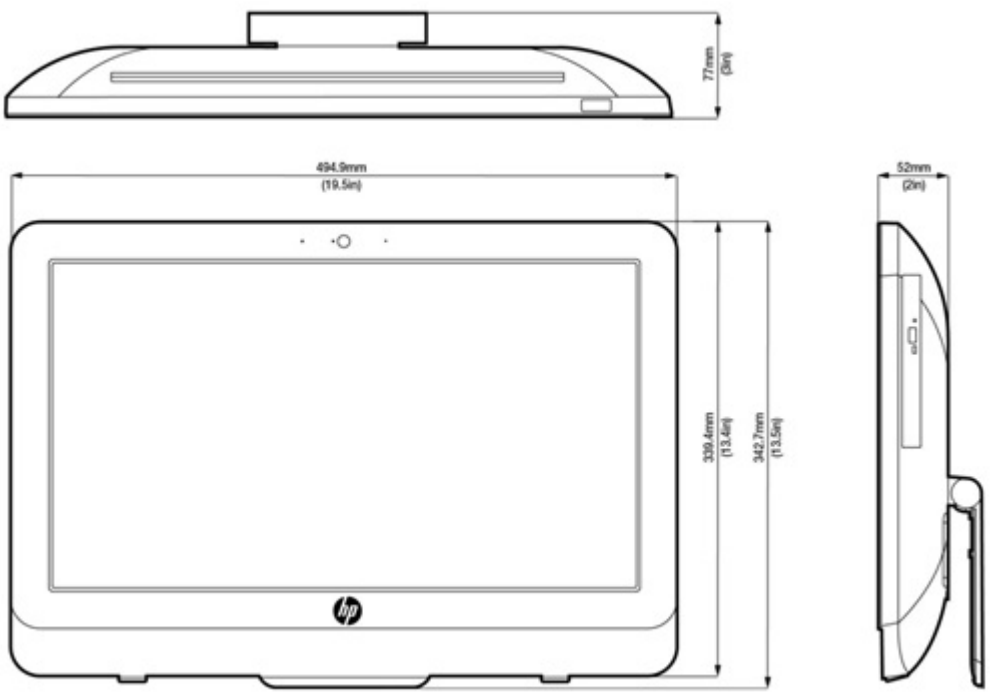
With stand
19.5 x 3 x 13.5 in
494.9 x 77 x 342.7 mm

Without stand
19.5 x 2 x 13.4 in
494.9 x 52 x 339.4 mm

Shipping box
23.3 x 7.6 x 17.6 in
591x 193 x 448 mm

Shipping pallet (50 units)
47.2 x 39.4 x 93.3 in
1200 x 1000 x 2370 mm

Detailed dimensions



Standard Features and Configurable Components (availability may vary by country)

TEMPERATURE, HUMIDITY, ALTITUDE

Temperature	Operating	41 to 95°F 5 - 35°C
	Non-operating	-22 to 149°F -30° to 65°C
Relative humidity	Operating	15 - 80% at 26° C
Altitude (unpressurized)	Operating	0 to 6500 ft (0 to 2000 m)
	Non-operating	0 to 15,000 ft (0 to 4,572 m)

PORTS

I/O Ports - Standard

2 - USB 3.0 (2 side including 1 fast charging)

USB Fast Charging Port:

- Up to 2.5A charging current (5 times the maximum current supported by a USB 2.0 port; 2.8 times the maximum current supported by a USB 3.0 port)
- D+/D- CDP/DCP Modes per USB Battery Charging Specification 1.2
- D+/D- Shorted Mode per Chinese Telecommunication Industry Standard YD/T 1591-2009
- Supports non-BC1.2 Charging Modes by Automatic Selection
- D+/D- Divider Modes 2.0V/2.7V and 2.7/2.0V
- D+/D- 1.2V Mode
- Supports Sleep-Mode Charging
- Automatic SDP/CDP Switching for Devices That do not Connect to CDP Ports

4 - USB 2.0 (rear)
1 - Microphone in (side)
1 - Headphone jack (side)
1 - Serial RS-232 (rear)
1 - Stereo audio line out (rear)
1 - Power connector (rear)
1 - RJ-45 (rear)
1 - DisplayPort

DisplayPort connector supports multimode technology to support connection to DVI-D, HDMI and VGA monitors with optional adapters or to a DisplayPort monitor with a DisplayPort Cable.

DisplayPort Cable	Provides a direct connection between the PC's DisplayPort interface to the display's DisplayPort interface
DisplayPort To DVI-D Adapter	Provides a connection from the PC's DisplayPort interface to the display's DVI-D interface; adapts the DP output to the DVI-D input
DisplayPort To HDMI Adapter	Provides a connection from the PC's DisplayPort interface to the display's HDMI interface; adapts the DP output to the HDMI input
DisplayPort To VGA Adapter	Provides a connection from the PC's DisplayPort interface to the display's analog VGA interface; adapts the digital DP output to the analog VGA input

SLOTS

1 - mini PCIe half-length (used by optional wireless LAN module)

BAYS

1 - 3.5" internal; Supports One - 3.5" hard drive or up to One - 2.5" hard drives (HDD/SSD/SED/SSHD)
1 - 5.25" external; Slim Line Optical Drive

Standard Features and Configurable Components (availability may vary by country)

SERVICE AND SUPPORT

On-site Warranty[1]: Standard one-year (1-1-1) limited warranty delivers one year of on-site, next business day[2] service for parts and labor and includes free telephone support[3] 24 x 7. One-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing a Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured Compaq and third-party HP qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Intel HD Graphics

VGA Controller	Integrated
DisplayPort	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 2 displays (including the integrated panel)
Bus Type	N/A
RAMDAC	N/A
Memory	Intel graphics do not have dedicated memory but utilizes some of the computer's system memory The amount of memory used for graphics depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.

Maximum Graphics Memory

Microsoft Windows 7	Windows 8.1
Up to 1.7GB	Up to 1.8GB

NOTE: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.

Maximum Color Depth 32 bits/pixel

Graphics/Video API Support 4th Generation Core processors:

- The Processor Graphics contains a refresh of the seventh generation graphics core enabling substantial gains in performance and lower power consumption. Up to 16 EU support.
- Next Generation Intel Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience
  - Encode/transcode HD content
  - Playback of high definition content including Blu-ray Disc
  - Superior image quality with sharper, more colorful images
- DirectX Video Acceleration (DXVA) support for accelerating video processing
  - Full AVC/VC1/MPEG2 HW Decode
- Advanced Scheduler 2.0, 1.0
- Windows 7, Windows 8.1, Linux OS Support
- DirectX 11.1
- OpenGL 4.0
- Open CL 1.2

Supported Display Resolutions and Refresh Rates

NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Refresh Rates
800x600	60 Hz
1024x768	60 Hz
1152x864	60 Hz
1280x600	60 Hz
1280x720	60 Hz
1280x800	60 Hz
1280x960	60 Hz
1280x1024	60 Hz
1360x768	60 Hz
1366x768	60 Hz
1400x1050	60 Hz
1440x900	60 Hz
1600x900	60 Hz

Technical Specifications - Graphics

1600x1200*	60 Hz
1680x1050	60 Hz
1920x1080	60 Hz
1920x1200*	60 Hz
1920x1440*	60 Hz
2560x1440*	60 Hz
2560x1600*	60 Hz

* Only supported on displays connected to the external DisplayPort connector.

Technical Specifications – Hard Disk and Solid State Storage

Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP ProOne 400 G1 Series Business PC supports the latest SATA 6.0Gb/s specification.

SMART IV Technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

Smart IV is also known as IOEDC: I/O Error Detection Code.

Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver. AHCI support is typically implemented in RAID configurations

NOTE: GB = 1 billion bytes. Actual available capacity is less.

HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

Capacity	500,107,862,016 bytes	
Rotational Speed	7,200 rpm	
Interface	SATA 6 Gb/s	
Buffer Size	16 MB	
Logical Blocks	976,773,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	
Width (nominal)	Media diameter: 3.5 in/8.89 cm	
	Physical size: 4 in/10.2 cm	
Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications – Hard Disk and Solid State Storage

HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	1,000,204,886,016 bytes	
Rotational Speed	7,200 rpm	
Interface	SATA 6 Gb/s	
Buffer Size	32 MB	
Logical Blocks	1,953,525,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	
Width (nominal)	Media diameter: 3.5 in/8.89 cm	
	Physical size: 4 in/10.2 cm	
Operating Temperature	41° to 131° F (5° to 55° C)	

HP 2-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	2 TB	
Rotational Speed	7,200 rpm	
Interface	SATA 6 Gb/s	
Cache, Multisegmented (MB)	64 MB	
Seek Time (average)	Read	<8.5 ms
	Write	<9.5 ms
Height	1.028 in/26.11 mm	
Width	4.0 in/101.6 mm	
Depth	5.787 in/146.99 mm	
Weight	1.38 lb/626 g	
Operating Temperature	32° to 140° F (0° to 60° C)	

HP 320-GB 7.2K SATA 6.0Gb/s 2.5" Hard Disk Drive

Capacity	320,072,933,376 bytes	
Rotational Speed	7,200 rpm	
Interface	SATA 6 Gb/s	
Buffer Size	16 MB	
Logical Blocks	488,397,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	12 ms
	Full-Stroke:	22 ms
Height (nominal)	0.374 in/9.5 mm	
Width (nominal)	Media diameter: 2.5 in/63.5 mm	
	Physical size: 2.75 in/70 mm	
Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications – Hard Disk and Solid State Storage

HP 500-GB 7.2K SATA 6.0Gb/s 2.5" Hard Disk Drive

Capacity	500,107,862,016 bytes	
Rotational Speed	7,200 rpm	
Interface	SATA 6 Gb/s	
Buffer Size	16 MB	
Logical Blocks	976,773,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	12 ms
	Full-Stroke:	25 ms
Height (nominal)	0.374 in/9.5 mm	
Width (nominal)	Media diameter: 2.5 in/63.5 mm	
	Physical size: 2.75 in/70 mm	
Operating Temperature	41° to 131° F (5° to 55° C)	

HP 128 GB SATA 2.5" Self-Encrypting (SED) Solid State Drive

Unformatted Capacity	128 GB	
Architecture	Self-Encrypting (SED) Solid State Drive using NAND Flash and SATA interface	
Interface	SATA 6 Gb/s	
Height	.267 in/6.80 mm	
Width	2.75 in/69.85 mm	
Length	3.94 in/100.2 mm	
Weight	0.121 lb (55 g) max	
Performance	Host Transfer Rate:	600 MB/s
	Sequential Read:	Up to 520 MB/s
	Sequential Write:	Up to 340 MB/s
	* Actual performance may vary depending on use conditions and environment ** **NOTES:** 1. Measured at HP 8570p@Win7 x64 2. Performance measured using CrystaldiskMark 3.01c 3. Drive was connected as primary	
Power	System power consumption:	Active* - 0.78A / 3.891W (typical)
	System power consumption:	Idle** - 0.005A / 0.026W (typical)
	* Active power is measured during execution of IOMeter 2006 in Windows 7 ** Idle power is measured on DOS Idle status with DIPM on	
System Reliability	MTBF - 1,500,000 Hours	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1500G, duration 0.5ms, Half Sine Wave

Technical Specifications – Hard Disk and Solid State Storage

HP 256 GB SATA 2.5" Self-Encrypting (SED) Solid State Drive

Unformatted Capacity	256 GB	
Architecture	Self-Encrypting (SED) Solid State Drive using NAND Flash and SATA interface	
Interface	SATA 6 Gb/s	
Height	.267 in/6.80 mm	
Width	2.75 in/69.85 mm	
Length	3.94 in/100.2 mm	
Weight	0.121 lb (55 g) max	
Performance	Host Transfer Rate:	600 MB/s
	Sequential Read:	Up to 520 MB/s
	Sequential Write:	Up to 460 MB/s
	* Actual performance may vary depending on use conditions and environment ** **NOTES:** 1. Measured at HP 8570p@Win7 x64 2. Performance measured using CrystaldiskMark 3.01c 3. Drive was connected as primary	
Power	System power consumption:	Active* - 0.78A / 3.891W (typical)
	System power consumption:	Idle** - 0.005A / 0.026W (typical)
	* Active power is measured during execution of IOMeter 2006 in Windows 7 ** Idle power is measured on DOS Idle status with DIPM on	
System Reliability	MTBF - 1,500,000 Hours	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1500G, duration 0.5ms, Half Sine Wave

HP 500-GB 7200 RPM SATA 2.5" Self-Encrypting (SED) Hard Disk Drive

Capacity	500,107,862,016 bytes	
Rotational Speed	7,200 rpm	
Drive Type	Self-Encrypting Drive (SED) with SATA interface	
Interface	SATA 6 Gb/s	
Segmented Buffer with write cache	32768 KB - A portion of buffer capacity used for firmware	
Number of Sectors	976,773,168	
Seek Time (typical reads)	Single Track:	1.0 ms
	Average:	13 ms
	Full-Stroke:	25 ms
Media Diameter	2.5 in/63.5 mm	
Height	0.267 in/6.8 mm, ±0.2mm	
Width	2.75 in/69.85 mm, ±0.25mm	
Length	3.945 in/100.2 mm, ±0.25mm	
Weight	3.35 oz/95 g (max)	
Operating Temperature	32° to 140° F (0° to 60° C)	

Technical Specifications – Hard Disk and Solid State Storage

HP 500 GB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)

Formatted Capacity	500 GB	
Spindle Speed	5,400 rpm +/- 0.2%	
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
Interface	SATA 6 Gb/s	
Cache Buffer	64 MB	
NAND Flash Commercial Multilevel Cell (cMLC)	8 GB	
Number of Sectors	976,773,168	
Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	12 ms
Height	0.268 +/-.008 in (6.8 +/- 0.2 mm)	
Width	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	
Length	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)	
Weight	0.209 lb/95 g (max)	
Operating Temperature	32° to 140° F (0° to 60° C)	

HP 1-TB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)

Formatted Capacity	1 TB	
Spindle Speed	5,400 rpm +/- 0.2%	
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
Interface	SATA 6 Gb/s	
Cache Buffer	64 MB	
NAND Flash Commercial Multilevel Cell (cMLC)	8 GB	
Number of Sectors	976,773,168	
Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	12 ms
Height	0.374 +/-.008 in (9.5 +/- 0.2 mm)	
Width	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	
Length	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)	
Weight	0.254 lb/115 g (max)	
Operating Temperature	32° to 140° F (0° to 60° C)	

Technical Specifications - Removable Storage

HP Slim SuperMulti DVD Writer Drive

Height	12.7mm height	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard	
Dimensions (W x H x D)	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)	
Weight (max)	0.42 lb (190 g)	
Write speeds	DVD-RAM	Up to 5X
	DVD-R DL	Up to 6X
	DVD+R	Up to 8X
	DVD+RW	Up to 8X
	DVD+R DL	Up to 6X
	DVD-R	Up to 8X
	DVD-RW	Up to 6X
	CD-R	Up to 24X
	CD-RW	Up to 24X
	DVD-RAM	Up to 5X
	DVD-RW, DVD+RW	Up to 8X
	DVD-R DL, DVD+R DL	Up to 8X
Read speeds	DVD+R, DVD-R	Up to 8X
	DVD-ROM DL, DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (typical reads, including settling)	Random	DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical)
	Full Stroke	DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
	Stop Time	6 seconds typical
Power	Source	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
Environmental conditions (operating - non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	84° F (29° C)

HP Slim Blu-ray BDXL Drive

Height	12.7mm height

Technical Specifications - Removable Storage

Orientation	Either horizontal or vertical		
Interface type	SATA/ATAPI		
Disc recording capacity	Up to 128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard SL		
Dimensions (W x H x D)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel		
Weight (max)	Up to 0.37 lb (170 g) without bezel		
Write speeds		**Triple-layer**	**Quadruple-layer**
	BD-R	Up to 4X	Up to 4X
	BD-RE	Up to 2X	Not supported
		Single-layer	**Double-layer**
	BD-R	Up to 6X	Up to 6X
	BD-RE	Up to 2X	Up to 2X
	DVD-R	Up to 8X	Up to 6X
	DVD-RW	Up to 6X	Not supported
	DVD+R	Up to 8X	Up to 6X
	DVD+RW	Up to 8X	Not supported
	DVD-RAM	Up to 5X	N/A
	CD-R	Up to 24X	N/A
	CD-RW	Up to 24X	N/A
		Triple-layer	**Quadruple-layer**
	BD-R	Up to 4X	Up to 4X
	BD-RE	Up to 4X	Not supported
		Single-layer	**Double-layer**
	BD-ROM	Up to 6X	Up to 6X
	BD-R	Up to 6X	Up to 6X
Read speeds	BD-RE	Up to 6X	Up to 6X
	DVD-ROM	Up to 8X	Up to 8X
	DVD-R	Up to 8X	Up to 8X
	DVD-RW	Up to 8X	N/A
	DVD+R	Up to 8X	Up to 8X
	DVD+RW	Up to 8X	N/A
	BDMV (AACS Compliant Disc)	Up to 6X/2X (Read/Play)	N/A
	DVD-RAM	Up to 5X	N/A
	DVD-Video (CSS Compliant Disc)	Up to 8X/4X (Read/Play)	N/A

Technical Specifications - Removable Storage

	CD-R/RW/ROM	Up to24X	N/A
	CD-DA(DAE)	Up to 20X/10X (Read/Play)	N/A
Access time (typical reads, including settling)	Random	BD-ROM: 205 ms (typical), DVD-ROM: 185 ms (typical), CD-ROM: 165 ms (typical)	
	Full Stroke	BD-ROM: 350 ms (typical), DVD-ROM: 345 ms (typical), CD-ROM: 340 ms (typical)	
	Source	Slimline SATA DC power receptacle	
Power	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p	
	DC Current	5 VDC -1200 mA typical, 2000 mA maximum	
	Temperature	41° to 122° F (5° to 50° C)	
Environmental conditions (operating - non-condensing)	Relative Humidity	10% to 80%	
	Maximum Wet Bulb Temperature	84° F (29° C)	

HP Slim DVD-ROM Drive

Height	12.7mm	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Dimensions (W x H x D)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel	
Weight (max)	Up to 0.37 lb (170 g) without bezel	
Read speeds	DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
	DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (typical reads, including settling)	Random	DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical)
	Full Stroke	DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
	Source	Slimline SATA DC power receptacle
Power	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum
	Temperature	41° to 122° F (5° to 50° C)
Environmental (all conditions non-condensing)	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature (operating)	84° F (29° C)

System Memory Support

The HP ProOne 400 G1 Business PC supports the 4th generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). Unlike previous generations, the 4th generation Intel® Core™ processor includes an Integrated Memory Controller (IMC). The IMC supports DDR3/DDR3L protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

- Two channels of DDR3/DDR3L unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- Memory data transfer rates of up to 1600 MT/s; actual supported data transfer rate determined by the configured processor.
- 64-bit wide channels
- DDR3/DDR3L system memory I/O voltage of 1.5V
- Theoretical maximum memory bandwidth of:
  - 21.3 GB/s in dual-channel mode assuming 1333 MT/s
  - 25.6 GB/s in dual-channel mode assuming 1600 MT/s

Platform Memory Support

- The All-in-One supports up to two (2) industry-standard DDR3-SDRAM SO-DIMMs.

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Realtek RTL8151GH-CG GbE LOM Network Adapter

Connector	RJ-45
System Interface	Integrated on PCA
Controller	Realtek RTL8151GH-CG Gigabit Ethernet Controller
Memory	16 KB FIFO packet buffer memory
Data rates supported	10/100/1000 Mbps
IEEE Compliance	802.1P 802.1Q 802.3 802.3ab 802.3az 802.3u
Bus architecture	PCI Express
Data transfer mode	PCIe-based interface for active state operation (S0 state)
Power requirement	Requires 3.3V and 1V or just 3.3V with integrated regulators Power consumption 0.425 W
Network transfer mode	Full-duplex Half-duplex (not supported for the 1000BASE-T transceiver)
Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
Environmental	Operating Temperature: 32° to 158° F (0° to 70° C) Operating Humidity: 60% RH
Management	WOL, auto MDI crossover, PXE, Muti-port teaming, Advanced cable diagnostic

Intel Dual Band Wireless-N 7260 802.11 a/b/g/n (2x2) Wireless Network Interface Connection

Wireless LAN Standards	IEEE 802.11a/b/g/n	
Interoperability	Wi-Fi certified (802.11 a/b/g/n WMM, WPA, WPA2 and WPS) Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP. **NOTE:** WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.	
Frequency Band	802.11b/g/n	2.402-2.482 GHz
	802.11a/n	4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz
Antenna Structure	2 transmit; 2 receive (2x2)	
Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)	
Modulation	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM	

Technical Specifications - Networking/Communication

Security	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI **NOTE:** Check latest software/driver release for updates on supported security features.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Network Architecture **Models**	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between band Access Points
Output Power	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum **NOTE:** Maximum output power may vary by country according to local regulations.
Power Consumption	Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode: 250 mW (WLAN associated) In Power Save Polling mode and on battery power. Idle mode: 100 mW (WLAN unassociated) Radio off: 100 mW (WLAN unassociated)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity **NOTE:** Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).	802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)
Antenna Connections	2 U.FL type connectors (output impedance of 50 ± 2 ohms)
Form Factors	PCI-Express Half-MiniCard
Weight	0.0068 lb (3.1 g)
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
Operating Voltage	3.3V +/- 9%
Temperature	**Operating:** 14° to 158° F (-10° to 70° C) **Non-operating:** -40° to 176° F (-40° to 80° C)
Humidity	**Operating:** 10% to 90% (non-condensing) **Non-operating:** 5% to 90% (non-condensing)
Altitude	**Operating:** 0 to 10,000 ft (3,048 m) **Non-operating:** 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber - Radio OFF; LED White - Radio ON

Technical Specifications - Networking/Communication

HP 802.11a/b/g/n Wireless Minicard with Bluetooth Combo

Dimensions (L x H)	1.18 x 1.06 in (30 x 26.8 mm)
Chipset	Broadcom BCM43228 + BCM20702
System interface	PCI Express x1
Network standard	802.11 a/b/g/n
Frequency band	Bluetooth: 2.402 - 2.480 GHz Wi-Fi: 802.11a - 5.15-5.85 GHz; 802.11bg 2.412-2.4835 GHz
Operating temperature	32° to 131°F, operating (0° to 55°C, operating)
Storage temperature	-40° to 176°F, non-operating (-40° to 80°C, non-operating)
Humidity	5-90% operating 5-95% non-operating
Operating voltage	3.3 V ±9% I/O supply voltage

	Platform/WLAN Mode	Power Consumption
Power Consumption	**Wi-Fi**	
	Tx Mode	515 mA
	Rx Mode	425 mA
	Bluetooth	
	Tx Mode	40 mA
	Rx Mode	38 mA
	Standby Mode	Wi-Fi + Bluetooth - 165 mA Wi-Fi only - 165 mA Bluetooth only - 0.5 mA
	Radio Off	77 mA
Output Power (2x2 - Tolerance +/- 1.5 dBm)	802.11 a	15.5 dBm@6Mbps; 15.5 dBm@54Mbps
	802.11 b	18.5 dBm@11Mbps
	802.11 g	16.5 dBm@6Mbps; 16.5 dBm@54Mbps
	802.11 n/2.4G	20MHz: 18 dBm@MCS0; 18 dBm@MCS15 40MHz: 17 dBm@MCs0; 17 dBm@MCS15
	802.11 n/5G	20MHz: 16 dBm@MCS0; 16 dBm@MCS15 40MHz: 16 dBm@MCs0; 16 dBm@MCS15

Security	IEEE 802.11i 64-/128-bit WEP encryption WPS, WPA, WPA2, WEP 64bit & 128bit, IEEE 802.11x, IEEE 802.11i
Antenna	Dual antenna connectors

Realtek ALC3228 High Definition Audio

Type	Integrated
HD Stereo Codec	Realtek ALC3228 4-channel codec
Ports	Line-In/Microphone input ports are 47K (nominal) at the pin Line-Out intended to drive an external 10K load (nominal) and an on board shunt resistor of 20-47K (nominal) Headphone-Out designed to drive 32 ohm (nominal) headphones or a 10K (nominal) load All ports are 3.5 mm
Internal Speaker Amplifier	2.2W/channel Class-D stereo BTL speaker amplifier@ 4 ohms and 5V
Sampling	The ALC3228 audio CODEC provides stereo 24- bit, full duplex resolution supporting sample rates up to 192kHz by the DAC and ADC. Additional sample rates are supported by the driver software.
Analog Audio	Yes
# of Channels on Line-Out	4 Channels (2 stereo DACs and 2 stereo ADCs) with 24-bit resolution
Internal Speaker	Yes

Technical Specifications – Keyboards and Mice

HP USB Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.12 x 6.47 x 0.96 in (46.03 x 16.43 x 2.44 cm)
	Weight	2 lb (0.9 kg)
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Microsoft® PC 99 - 2001	Functionally compliant
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

Technical Specifications – Keyboards and Mice

HP Wireless Keyboard and Mouse

Keyboard	Dimensions (H x L x W)	1.09 x 18.1 x 6.47 in (27.87 x 460.3 x 164.3 mm
	Weight – Without Two AA Alkaline Batteries	1.94 lb (880 g)
Mouse	Dimensions (H x L x W)	1.46 x 4.53 x 2.47 in (37 x 115 x 62.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.15 lb (67 g)
Receiver	Dimensions (H x L x W)	0.33x 1.79 x 0.72 in (8.4 x 45.5 x 18.4 mm)
	Weight	0.21 oz (5.9 g)
	Cable Length – Minimum	6 ft (1.8 m)
	Range	32.8 ft (10 m)
System Requirements	Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64* Windows Vista or Windows XP Available USB port for the receiver CD-ROM Drive *This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.	
	Product Safety	UL; CSA /TUV (Europe only); CE Mark; CB Report
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)
	EMC	FCC; CE; ACA (-tick); BSMI; KC ; VCCI
	CE Mark	EN 55022:2010; EN 55024; EN 301489-1; EN 61000
	Design Guidelines for PCs	PC 99 - connector overmold colors; PC 2001 - full functionality
	Telecom	All local telecom requirements and approvals for intended markets
	USA	FCC Title 47 CFR, Par 15, Subpart C; other local requirements
	Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxemburg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, Thailand, Canada, China, Japan, Korea, Taiwan, India, Venezuela, Ecuador, Russia, Ukraine, Israel, Croatia, United Arab Emirates, Peru, Brazil, Chile, Argentina, Mexico, South Africa, and up to 193 countries worldwide.
Environmental	Keyboard contains 25% post-consumer recycled plastic material	

HP USB Smart Card (CCID) Keyboard

Introduction:

Boost your security, simplify access procedures and reduce the costs associated with managing networks by preventing

Technical Specifications – Keyboards and Mice

unauthorized access to your computers and networks using smartcard technology with the HP Smart Card (CCID) Keyboard.

The USB Smart Card (CCID) Keyboard is a full-sized keyboard that takes advantage of digital signatures and certificates to secure the environment for transactions performed on both public and private networks. The USB Smart Card (CCID) Keyboard works with all smart cards that comply with ISO standard 7816.

Smart cards are easy-to-use credit card-sized devices which require multiple forms of information to be validated before you gain access to your accounts or resources. Used worldwide, smart cards strengthen access to a network or other resource using dual-factor authentication. Implementing a two-factor authentication (or multi-factor authentication) process reduces the risk of unauthorized access by verifying and validating your identity in one of the following ways:

- Something you know – a combination of username and password or PIN
- Something you have – a smart card or security token.

Something you have (smart card) plus something you know (PIN), improves user-access security within corporate network environments. Smart cards are used in government agencies, healthcare companies and the finance industry.

HP ProtectTools Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP ProtectTools Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

Key Benefits:

- Protects against unauthorized access with smart card technology
- Delivers even greater security when combined with a HP ProtectTools smart card and the HP ProtectTools Security Software
- Combination of username and password or pin with a smart card or security token
- Secures online transactions using digital signatures and certificates
- Conforms to industry standards for ease of setup and use
- Delivers long product life and quiet operation with high-impact materials and lubricated keys
- Spill drain feature

Physical Characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country
	Form factor	USB basic smart card keyboard
	Colors	Carbonite/Silver
	Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)
	Weight	2 lb (0.9 kg) minimum
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	100-mA maximum (with four LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
Mechanical	Languages	30+ available
	Keycaps	Standard design
	Switch actuation	55 g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)

Technical Specifications – Keyboards and Mice

Environmental	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
SmartCard Function	Support	All ISO 7816 smart cards	
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)	
	Chipset	SCM STCIII	
	Standard APIs supported	PC/SC, EMV2000, CT-API	
	Power	USB Port	
		Short circuit detection (protects smart card and reader)	
		Power supply compliant with ISO7816 and EMV (5V, 60 mA)	
		Supports 3-V and 5-V cards	
	Power consumption	100-mA maximum draw	
	Communication	From card	9600 bps to 330,000 bps
		From computer	12 Mbps (USB transfer speed)
	Landing mechanism	Contact device	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles
	Interface modes	CCID protocol	
	Reader performance interface	USB connection	
	Electro-magnetic standards	Europe	2004/108/EC
		USA	USAFCC part 15
Approvals	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF		
Ergonomic Compliance	ISO 9241-4, TUVGS		
Kit Contents	Keyboard, I/O Security and Documentation CD, warranty card		

Technical Specifications – Keyboards and Mice

HP USB PS/2 Washable Keyboard

Physical Characteristics	Keys	104 (US) Layout, 105 (EU) layout - depending upon country
	Dimensions (L x W x H)	17.67x 6.62 x 1.38 in (449 x 168 x 35 mm)
	Weight	1.7 lb (0.77 kg) minimum
Electrical	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Microsoft® PC 99 - 2001	Functionally compliant
	Keycaps	Stepped -profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	7 ft (2.2 m)
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	4° to 149° F (-20° to 65° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Operating system support	Windows® 7, Windows Vista, Windows XP Professional	
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

Technical Specifications – Keyboards and Mice

HP USB Mouse

Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.7 x 11.5 x 6.3 cm)
Weight	0.22 lb (0.10 kg)
Cable length	70.9 in (180 cm)
System requirements	Available USB port

HP USB 1000dpi Laser Mouse

Dimensions (H x L x W)	1.47 x 4.53 x 2.47 in (37.3 x 114.97 x 62.86 mm)	
Weight	3.360 oz (102g)	
Cable length	70.9 in (180 cm)	
System requirements	Available USB port	
Environmental	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)
	Operating Humidity	10% to 90% (non-condensing at ambient)
Mechanical	Resolution	1000dpi
	Tracking Speed	45 cm/sec
	Cable Length	70.9 in (180 cm)

HP USB PS/2 Washable Mouse

Dimensions (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
Weight	4.44 oz (126 g)	
Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
	Non-operating temperature	-4° to 140°F (-20° to 60° C)
	Operating humidity	10% to 90% (non condensing at ambient)
	Non-operating humidity	10% to 90% (non condensing at ambient)
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Electrical	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector
	ESD	CE level 4, 15 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC99 – 2001	Functionally compliant
Mechanical	Resolution	400 ± 20% DPI

Technical Specifications – Keyboards and Mice

	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	100 in/s/s (2.54 m/s/s)
	Switch actuation	61 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
	Cable length	6 ft (1.8 m)
	Microsoft PC99 – 2001	Mechanically compliant
Scroll wheel	Width	8 mm
	Diameter	1.01 in (25.6 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
Compatibility	Operating system support	Windows 7, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* (No driver is required for this device. Native support is provided by the operating system.), xpe, ce.net, Linux, XP-64 * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Options and Accessories (sold separately)

AFTER MARKET OPTIONS:

MEMORY	Part Number
HP 2GB DDR3-1600 (PC3-12800) SODIMM	B4U38AA
HP 4GB DDR3-1600 (PC3-12800) SODIMM	B4U39AA
HP 8GB DDR3-1600 (PC3-12800) SODIMM	B4U40AA

DATA STORAGE DRIVES AND ACCESSORIES	Part Number
HP 1TB, 7200 rpm, SATA -6.0 Gb/s	QK555AA
HP 500GB, 7200 rpm, SATA -6.0 Gb/s	QK554AA
HP 500GB SATA , 6G (8GB cache) Solid State Hybrid Drive (SSHD)	E1C62AA
HP 128GB SATA Solid State Drive	QV063AA
HP 180GB SATA Solid State Drive	TBD
HP Slim SATA DVD-ROM Drive	VP033AA
HP Slim SATA BDXL Blu-Ray Writer Drive	E0X94AA
HP Slim SATA SuperMulti DVD Writer Drive	QS209AA
HP Slim Removable SATA HDD Frame/Carrier	C1N41AA
HP Slim Removable SATA HDD Carrier	E3F39AA

INPUT DEVICES - KEYBOARD AND MOUSE COMBO	Part Number
HP USB PS/2 Washable Keyboard & Mouse	BU207AA
HP Wireless Keyboard & Mouse	QY449AA

INPUT DEVICES - KEYBOARD	Part Number
HP USB Grey Keyboard	B6B64AA
HP USB Smart Card (CCID) Keyboard	BV813AA
HP USB Keyboard	QY776AA

INPUT DEVICES - MOUSE	Part Number
HP USB 1000dpi Laser Mouse	QY778AA
HP USB Mouse	QY777AA
HP Mouse Pad	AT485AA

SECURITY	Part Number
HP UltraSlim Cable Lock	H4D73AA

GRAPHICS - VIDEO ADAPTERS AND CABLES	Part Number
HP DisplayPort Cable Kit	VN567AA
HP DisplayPort To DVI-D Adapter	FH973AA
HP DisplayPort To HDMI Adapter	BP937AA
HP DisplayPort To VGA Adapter	AS615AA
HP DVI Cable	DC198A
USB Graphics Adapter	NL571AA
HP Dual Output USB Graph Adapter	C5U89AA

STANDS AND MONITOR ARM	Part Number
HP Single Monitor Arm	BT861AA

Options and Accessories (sold separately)

HP (Flat Panel Monitor) Quick Release	EM870AA

MISCELLANEOUS	Part Number
Belkin 7-Outlet Surge Protector for North America 120V	AG290AA
Belkin USB to Serial Adapter	EM449AA
Belkin CAT5e Patch Cable RJ45/RJ45	AH122AA
HP Business Headset	QK550AA

ADDITIONAL MONITORS FOR MULTI-DISPLAY CONFIGURATIONS	Part Number
HP EliteDisplay E201 20-inch LED Backlit Monitor	C9V73AA
HP EliteDisplay E221 21.5-inch LED Backlit Monitor	C9V76AA
HP EliteDisplay E231 23-inch LED Backlit Monitor	C9V75AA
HP LA2405x 24-inch LED Backlit Monitor	D0P36AA
HP EliteDisplay E271i 27-inch LED Backlit Monitor	D7Z72AA
HP EliteDisplay E221c 21.5-inch WebCam LED Backlit Monitor	D9E49AA
HP L2206tm 21.5-inch LED Backlit Touchscreen Monitor	B0L55AA

LANDESK SOFTWARE (E-DELIVERY)	Part Number
Contact your HP representative for available options.	

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